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Éléments de Paléobotanique. By R. ZEILLER. 8vo, pp. 421, with 210 illustrations. Paris: Georges Carré et C. Naud, 1900.

The great needs of recent years in Paleobotany have been a summary of the scattered materials and the delimitation of well-founded data from data that are more or less uncertain. A great stride forward has been taken along these lines and as a result we are in a position to speak more categorically as to plant fossils. The first part of Professor Seward's work appeared sometime ago and has been reviewed in these pages¹. Almost simultaneously three valuable works have recently appeared, one in English by Professor Scott, one in German by Potonié, and the one which is the subject of this review. The standpoint of the three works is somewhat different, Scott taking the standpoint more of the morphologist, Potonié of the stratigrapher, while Zeiller combines the botanical and geological standpoints, though giving more emphasis to the botanical side. More than any book that has yet appeared, this is a book to be used with impunity by general readers and elementary students. The first chapter treats of the various methods by which plant fossils have been preserved, then follows a chapter on classification and nomenclature. The body of the book, of course, is made up of descriptions of the various fossil forms treated in order. The cuts are simple but clear and good, and the descriptions are doubtless the shortest and clearest that are found anywhere.

The conservatism of the author is shown at many points, and the difference between established and hypothetical data is clearly brought out. As an illustration of this, Zeiller constantly distinguishes between forms based on leaves and forms based on reproductive organs, as in the ferns. There are interesting discussions of the Sphenophylleæ and the Cycadofilices, though the author does not go so far as some in putting these forms in great groups by themselves.

At the close of the book are two chapters of extreme interest. The chapter on the succession of floras and climates is wonderfully meaty, and it is doubtful if a better summary of the known facts was ever written, certainly not in a shorter compass. The author theorizes but little from the facts presented, and such deductions as he makes in regard to climate are extremely conservative. The last chapter must be somewhat startling to many readers, as Zeiller thinks there is very little evidence from fossil plants in favor of gradual evolution. He states that in almost every case, species, genera, families, and

¹ JOUR. GEOL.: Vol. VI, p. 436, 1898.

groups appear highly specialized and in their permanent form from the first. So-called intermediate forms like *Cheirostrobos* appear long after the forms they are supposed to connect. Genera and species that vary now have always varied and the limits of variation now and in the past have been the same and definitely prescribed. In short Zeiller believes that the evolution of all groups is a matter almost purely of speculation. Doubtless most scientists will fail to accept Zeiller's views as to evolution, and yet it may be well to put a brake now and then to unlimited speculation; a perusal of Zeiller's final chapter certainly compels one to do that.—H. C. COWLES.

A Topographic Study of the Islands of Southern California. By W.S. TANGIER SMITH. Bulletin of the Department of Geology. University of California, Vol. II, pp. 179-230. 1900.

This bulletin involves an account of certain islands which have been studied in the field, and of others which have been studied from maps only. Following a description of the general topography of the islands, there is a somewhat full discussion of certain coastal features, especially of wave-cut terraces, and of wave and current-built features. This discussion is incisive, and will be of service to the student of coastal topography.

Following the descriptive matter there is a sketch of the history of the islands, from which the following extracts are made:

It is generally assumed that the broad physical features of the Pacific Coast were largely developed during the prolonged period of erosion between the Miocene and Pliocene,[†] and that these forms have been modified more or less by subsequent movements, both general and local, as well as by subsequent erosion and deposition. During the Miocene the land was depressed, as indicated by the Miocene deposits, the nonconformity between these and the Pliocene deposits showing a period of subaerial erosion, during which the land was more elevated than at present. This period of elevation and erosion was followed by the Pliocene depression, during which deposits of great thickness were laid down in favorable localities, the larger Miocene valleys being filled to a greater or less extent with deposits which have since been re-excavated to a greater or less extent.

[†]By the long interval between the Miocene and Pliocene is doubtless meant the long interval between the deposition of the California coastal Miocene, and the Pliocene of the same region.